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Date: 2/11/08

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Wolfgang ADERHOLD	**Attorneys Docket:**	AM-8304
Serial No.:	10/788,979	**Confirmation No.:**	6862
Filed:	February 27, 2004	**Art Unit No.:**	3742
Examiner:	S. Y. Paik		

For: "BACKSIDE RAPID THERMAL PROCESSING OF PATTERNED WAFERS"

Commissioner for Patents
Alexandria, VA 22313-1450

SUPPLEMENTARY APPEAL BRIEF UNDER 37 CFR §41.37
SUMMARY OF CLAIMED SUBJECT MATTER

Sir:

The Appeal Brief is filed in support of the appeal of the above application dated September 13, 2007.

This Supplementary Appeal Brief corrects the appeal brief filed 7 January 2008 by providing an augmented summary of the claimed subject matter (37 CFR 41.37(c)(1)(v), as required by the Notification of Non-Compliant Appeal Brief dated January 28, 2008.

At the suggestion of the patent appeal center specialist, this supplemental brief contains only the previously defective section (v).

(v) SUMMARY OF CLAIMED SUBJECT MATTER

The invention includes a method of rapid thermally processing (RTP) a wafer 12 as described for a conventional RTP chamber as described at page 1, line 25 to page 4, line 3 with reference to the prior art of FIG. 1. The type of thermal processing is wide and can include annealing, crystallization, oxidation, chemical vapor deposition, and cleaning, as described at page 1, lines 13 – 15. The cited description is directed to a conventional RTP chamber in FIG. 1 in which an edge ring 14 overlaps an undefined portion of the outer portion of the wafer 12 on its unfeatured backside to supports the wafer 12 with its features 16 being developed in the RTP processing on its upwardly facing front side exposed to an array of radiant bulbs 26. Conventionally, pyrometers 40 have light pipes 42 facing the wafer backside to measure the temperatures at different radial portions of the wafer 12 to control the amount and distribution of radiant energy delivered to the wafer.

Claim 1

According to the invention of base method claim 1, as described at page 7, lines 16 – 21 with reference to FIG. 3, the wafer 12 is inverted to be disposed on a modified edge ring 64 with its unfeatured back side facing the radiant lamps 26. The edge ring 64 supports the front side of the wafer 12 having the features 16 being developed. As described at page 8, line 8, lines 22-24, the pyrometers 40 then directly monitor through light pipes 42 the temperature of the features (IC dies)16 being developed on the downwardly facing front side of the wafer 12. An advantage of the frontside pyrometry, as described at page 8, lines 22-24, is that the temperature of the developing integrated circuits is monitored rather than the back side of the wafer.

Claim 3

According to the invention of base method claim 3, as described at page 7, lines 16 – 19 with reference to FIG. 3, the wafer 12 is inverted to be disposed on a modified edge ring 64 with its unfeatured back side facing the radiant lamps 26. The front side of the wafer 12 with its

features 16 is supported on an annular shelf 62 of the edge ring 64, as additionally illustrated in FIGS. 4 and 5. As described at page 4, lines 14 – 20 with reference to FIG. 2, rectangular integrated circuit dies 50 are developed only with the central portion of the wafer 12 and are not developed in the edge exclusion zone 52 at the periphery of the wafer 12. As described at page 7, lines 19 – 30 with reference to FIGS. 4 and 5, the shelf 62 of the supporting edge ring 64 extends under the front side of the wafer 12 by a distance *V* with is less than the wafer edge exclusion zone 52. As described at page 8, line 8, lines 22-24, the pyrometers 40 then directly monitor through light pipes 42 the temperature of the features (IC dies)16 being developed on the downwardly facing front side of the wafer 12. The advantages of the narrow support within the exclusion zone include the reduction of particles described at page 9, lines 8 – 10 as well as the obvious advantage of not shielding otherwise good die areas.

Claim 8

According to the invention of base method claim 8, as described at page 2, lines 20 – 29, a reflector 28 faces the bottom of the wafer 12 and reflects heat radiation emitted from the wafer 12 back toward the wafer 12 to form a black body cavity at the back of the wafer 12. As described at page 7, lines 16 – 21 with reference to FIG. 3, the wafer 12 is inverted to be disposed on a modified edge ring 64 with its unfeatured back side facing the radiant lamps 26 and, as described at page 7, lines 29, 30, the patterned front side of the wafer faces downwardly to the reflector 28. The advantages of placing the developing features within the black body cavity are described at page 8, lines 15 – 21.

Claim 12

According to the invention of base apparatus claim 12, as described at page 7, lines 16 – 19 with reference to FIG. 3, the wafer 12 is inverted so that its unfeatured back side faces the radiant lamps 26 and its front side of the wafer 12 with its downwardly facing features 16 is supported on holding means including an annular, such as a sloping annular shelf 62 of the edge

ring 64. The edge ring is additionally illustrated in FIGS. 4 and 5 described at page 10, line 6 to page 11, line 4. The edge ring 64 of the described embodiment is modified so that it extends inwardly from the edge of the wafer 12 only a short distance and overlaps no more than the edge exclusion zone 52 of the wafer 12. The edge exclusion zone 52 is that outer peripheral area of the wafer not having features 16, that is, integrated circuits, formed in it. It is conventionally small, extending inwardly from the wafer edge by a distance of the order of 3 mm. As described at page 2, lines 20 – 29, a reflector 28 faces the bottom of the wafer 12 and reflects heat radiation emitted from the wafer 12 back toward the wafer 12 That heat originates from the radiant lamps 26. As described at page 7, lines 29, 30, the patterned front side of the wafer 12 faces downwardly to the reflector 28. The advantages of placing the developing features within the black body cavity are described at page 8, lines 15 – 21.

Claims 13 and 15

According to the inventions of dependent claims 13 and 15, as described at page 12, lines 2-17 with reference to FIG. 7, the inverted orientation of the wafer 12 allows holding means or a holding member 90 to support the wafer 12 in its inverted orientation from above on its back side. In the described embodiments implement the holding means or holding member 90 as either a pneumatic cup or an electrostatic chuck.

The inverted orientation of the wafer provides several processing advantages over the normal upwardly facing orientation as described at page 8, line 1 to page 9, line 10.

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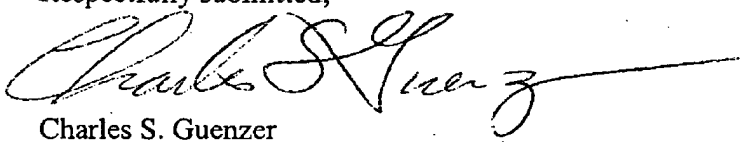
Respectfully submitted,



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